

RISE Talks Series

Who? Molly Crowther, Assistant Professor of Chemistry

What? **In Search of Signal.** *An Analytical Chemist's Venture in the Low-Level Analysis of Elements in Ancient Pottery.*

Where? Hall of Sciences, Room 326

When? 12:00-1:00 on Thursday, April 24

This talk will use an interesting case study, the elemental analysis of ancient pottery, to examine the most fundamental question in analytical chemistry: What is the signal and what is the noise? The low-level (part per billion) analysis of this work presents a particular challenge and requires careful analytical methodology and validation. How do we prevent confusing signal with noise (and vice-versa) in both the chemical analysis (considerations like detection limit and degrees of freedom) and the data analysis (for example, t-test and Principal Components)? How do we know our measurements, and conclusions based on them, are reliable? The examples used will be from our study of thirty pottery shards of Herodian oil lamps (first century, Bethsaida) which were analyzed for sixteen elements using atomic spectroscopy. Are the lamps of common origin or multiple origins? Are the lamps from Jerusalem? Sorting out the signal from the noise in the elemental fingerprint can help tell the story.

“The signal is the truth. The noise is what distracts us from the truth.”

Nate Silver, *The Signal and the Noise*, 2012.

